REMARKS

Reconsideration and allowance of the above-referenced application are respectfully requested. Claims 1-3 and 5-19 are pending in the application.

Applicant hereby amends the application as required to perfect the priority claim under 35 USC §119 and 37 CFR §1.78(a)(5). Since the subject application was filed before November 29, 2000, the time periods of 37 CFR §1.78(a)(5)(ii) do not apply. See 37 CFR §1.78(a)(5)(ii)(A).

The indiciation of informalities in the specification is appreciated. It is believed the specification as amended is in proper form. A marked-up version of the amendments to the specification is attached, where insertions are underlined and deletions are bracketed.

Acknowledgement of the formal drawings submitted April 16, 2001 is respectfully requested. A Drawing Change Authorization Request is concurrently submitted to correct the identified informality in Figure 1.

In view of the foregoing, it is believed the specification as amended is in proper form.

The cancellation of claim 4 renders the rejection under 35 USC §112 moot.

Claims 1-3 and 5-8 stand rejected under §103 in view of U.S. Patent No. 5,978,951 to Lawler et al, U.S. Patent No. 5,509,123 to Dobbins et al., and U.S. Patent No. 5,754,659 to Sprunk et al. This rejection is respectfully traversed. The following is a comparison between the rejected claims and the applied references.

Independent claim 1 specifies method in a network switch of searching for a selected layer 3 switching entry for a received data packet. Claim 1 specifies that the method includes

generating first and second hash keys according to a prescribed hash function in response to first and second layer 3 information within the received data packet, respectively, and combining the first and second hash keys according to a prescribed combination into a signature for the received data packet. The method of claim 1 also specifies searching a table, configured for storing layer 3 signatures that index respective layer 3 switching entries according to the prescribed hash function and the prescribed combination, for the selected layer 3 switching entry based on a match between the corresponding layer 3 signature and the signature for the received data packet.

Generation of the signature from at least two hash keys for searching of the table enables search operations, normally requiring multiple key searches, to be reduced in hardware to a single search operation, dramatically improving the speed of the search operation. Moreover, the generation of the hash keys using first and second layer 3 information enables layer 3 processing to be performed in real time in a network switch, while maintaining flexibility for programming of the layer 3 switch by searching the layer 3 signatures that index the layer 3 switching entries.

These and other features are neither disclosed nor suggested in the applied prior art.

Lawler et al. teaches generating separate and distinct hash keys based on recived layer 2 (i.e., link layer) information, namely MAC source address (SA) and MAC destination address (DA) (col. 5, lines 25-28). A first hash value is generated based on the SA and placed in a cache lookup queue for further processing by a cache lookup controller 118 (see col. 8, lines 5-18). A second hash value is generated from the DA and placed in the cache lookup queue 116 (see col. 8, lines 19-25). The cache lookup controller 118 then sequentially processes the cache lookup queue 116. (See col. 8, line 26 to col. 9, line 5).

As admitted in the Official Action, Lawler et al. does not disclose generating first and second hash keys according to a prescribed hash function in response to first and second layer 3 information; combining the first and second hash keys into a signature for the received data packet, or searching a table configured for storing layer 3 signatures that index respective layer 3 switching, as claimed.

Dobbins et al. discloses a software-based architecture for routing at the network layer (see, e.g., col. 4, lines 45-65). Dobbins et al. teaches use of "forwarding engines" (e.g., col. 6, lines 25-28) and implementation using object-oriented methodology written in the programming language C++(col. 8, lines 20-27): engines are terms of art that refer to software-based executable resources (i.e., application programs under execution by a microprocessor).

Further, Dobbins et al. neither discloses nor suggests combining the first and second hash keys, as claimed: Dobbins et al. combines the source and destination addresses before hashing to generate a one byte hash code (col. 10, lines 10-12). As admitted in the Official Action, the hypothetical combination of Lawler et al. and Dobbins et al. does not disclose or suggest generating first and second hash keys from respective first and second layer 3 information, and combining the first and second hash keys, as claimed.

Moreover, one having ordinary skill in the art would not have been motivated to combine the teachings of Lawler et al. and Dobbins et al., since Lawler et al. is concerned with avoiding software processing of frames that may result in higher device latency (see col. 1, lines 17-20 of Lawler et al.), whereas Dobbins et al. relies on software to provide object-oriented objects that are protocol-independent.

Further, there is no evidence of any motivation to modify Lawler et al. to include the teachings of Dobbins et al. The naked assertion of motivation to add Dobbins et al. (to speed up the route decision process in a protocol independent manner) is without foundation, especially since the addition of Dobbins et al. is contrary to stated objectives of Lawler et al. of avoiding sofware-based systems.

Sprunk et al. is non-analogous art because it is directed to generating and recovering cryptographic signatures that authenticate information from a plurality of different message groups without requiring the transmission of all of the authenticated information (col. 1, lines 1-12), and is not within the field of the inventors' endeavor, namely providing layer 2 switching and layer 3 switching at wire rates to minimize blocking and/or buffering; further, Sprunk et al. is not reasonably pertinent to the particular problem with which the inventors were involved, namely providing layer 3 processing in real time in a network switch that supports user-defined policies. Sprunk et al. provides no disclosure or suggestion of using hash keys combined into a signature for the purpose of searching a table configured for storing layer 3 signatures and respective layer 3 switching entries, and as such is non-analogous art. In re Wood, 202 USPQ 171, 174 (CCPA 1979).

Further, the Official Action relies on an unreasonable interpretation of tle claimed table configured for storing switching entries. Page 6 of the Official Action asserts that "one information group is the set of destination addresses and another information group is the set of source addresses such that the digital signature ensures that the destination address and source address have not been altered en route." This interpretation is nonsensical and without

foundation -- there is no evidence of any concern of any alteration of a source address or destination address; any hypothetical alteration merely would result in the packet being dropped.

The broadest reasonable interpretation cannot be inconsistent with the specification, which specifies that the multi-key packet signature to be used as a search key for searching of a layer 3 switching entry for the received data packet: these hash keys are combined to form the packet signature, which is then compared by the network switch port 20 with precomputed entry signatures to determine possible matches (see page 7, Figs. 3 and 4, and accompanying text). Any other interpretation would be inconsistent with the interpretation that those skilled in the art would reach, and hence would be unreasonable. Cf. In re Cortright, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999). Hence, "claims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification in giving them their 'broadest reasonable interpretation.'" MPEP § 2111.01 at 2100-37 (Rev. 1, Feb. 2000) (quoting In re Marosi, 218 USPQ 289, 292 (Fed. Cir. 1983)(emphasis in original)).

Finally, there is no evidence one skilled in the art would have been motivated to add the teachings of Sprunk et al. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Fritch, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992).

For these and other reasons, the hypothetical combination neither discloses nor suggests the features of claims 1-3 and 5-8 as a whole. Hence, this §103 rejection should be withdrawn.

Claim 9 stands rejected under §103 in view of Lawler et al., Dobbins et al., Sprunk et al., and further in view of U.S. Patent No. 6,084,877 to Egbert et al. and U.S. Patent No. 5,757,795 to Schnell. Claim 10 stands rejected under §103 in view of Lawler et al., Dobbins et al., Sprunk

et al., and Egbert et al. Claim 11 stands rejected under §103 in view of Lawler et al., Dobbins et al., Egbert et al., and Schnell. Claims 12-13 stand rejected under §103 in view of Lawler et al., Dobbins et al., Egbert et al., Schnell and Sprunk et al. Claims 14-15 stand rejected under §103 in view of Lawler et al., Dobbins et al., Egbert et al., Schnell, and U.S. Patent No. 5,852,607 to Chin. Claims 16-19 stand rejected under §103 in view of Dobbins et al., Egbert et al., and Schnell.

Hence, the §103 rejections of claims 9-19 rely on Egbert et al. as a reference. However, in view of the following statement under §103(c), Egbert et al. is not a reference. Hence, the §103 rejection of claims 9-19 should be withdrawn.

STATEMENT OF COMMON OWNERSHIP

At the time the invention was made, the two applications were owned or subject to an obligation of assignment to Advanced Micro Devices, Inc. In particular, the application for USP 6,084,877 to Egbert et al. was owned or under obligation of assignment to Advanced Micro Devices, Inc., and the subject application 09/496,212 was owned or under obligation of assignment to Advanced Micro Devices, Inc.

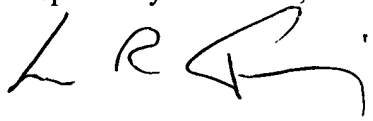
CONCLUSION

The Examiner's attention is directed to the concurrently submitted Change of Address Notice: please direct all future correspondence to Customer Number 20736.

In view of the above, it is believed this application is in condition for allowance, and such a Notice is respectfully solicited.

To the extent necessary, Applicant petitions for an extension of time under 37 C.F.R. 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including any missing or insufficient fees under 37 C.F.R. 1.17(a), to Deposit Account No. 50-0687, under Order No. 95-333, and please credit any excess fees to such deposit account.

Respectfully submitted,



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MARKED-UP VERSION OF AMENDMENTS

Paragraph starting at page 7, line 4:

The network switch port 20 also includes a port filter 40 that includes a frame identifier 42. The port filter 40 is configured for performing various layer 3 processing, for example identifying whether the incoming data packet includes a layer 3 IP datagram. The frame identifier 42 is configured for identifying the beginning of the IP frame, and locating the layer 3 address entries as the IP frame is received from the network. In particular, the frame identifier identifies the start position of the IP source address, IP destination address, TCP/UDP source port, and TCP/UDP destination port as the data is being received. The network switch port 20 also includes a flow module 44 configured for generating a packet signature using at least two (preferably all four) layer 3 address entries as their start position is identified by the frame identifier 42. In particular, the flow module 44 monitors the incoming data stream, and obtains the IP source address, IP destination address, TCP/UDP source port, and TCP/UDP destination port in response to start position signals output by the frame identifier 42.

Paragraph starting at page 9, line 7:

If in step 80 there are one or multiple matches detected by the flow module 44, then the flow module 44 verifies that one of the entries from the layer 3 switching entries matches the received data packet. In particular, the flow module 44 fetches in step 82 the layer 3 information from the layer 3 address entries stored in the policy table 28b having the matched entry signatures. The flow module 44 then performs a bit-by-bit comparison of the selected layer 3 address fields of each accessed layer 3 switching entry and the layer 3 address fields of the received data packet in step 84.

Hence, the flow module 44 identifies one of the layer 3 switching entries as a match with the received data packet in step 86 based on the final bit-by-bit comparison of the layer 3 address information. The flow module 44 and forwards the identified entry (e.g., by forwarding the address value) to the switching logic 25 enabling the layer 3 switching logic to execute the layer 3 switching decision that corresponds to the identified layer 3 switching entry matching the data packet.

Paragraph starting on page 14 (Abstract)

A network switch, configured for performing layer 2 and layer 3 switching in an Ethernet (IEEE 802.3) network without blocking of incoming data packets, includes network switch ports, each including a flow module configured for generating a packet signature based on layer 3 information within a received data packet. The flow module generates first and second hash keys according to a prescribed hashing function upon obtaining first and second portions of layer 3 information[, for example any two of IP source or destination address, transmission control protocol (TCP) source or destination port, or user datagram protocol (UDP) source or destination port]. The flow module combines the first and second hash keys to form the packet signature, and searches an on-chip signature table that indexes addresses of layer 3 switching entries by entry signatures, where the entry signatures are generated using the same prescribed hashing function on the first and second layer 3 portions of the layer 3 switching entries. [Hence, each network switch port can search for layer 3 switching information in real time as the data packet is received, enabling layer 3 switching logic within the network switch to execute the necessary layer 3 switching decision for the data packet based on the corresponding layer 3 switching entry identified by the network switch port.]